

✓ To Dr B. Dawson
POISONED WOUNDS;

THEIR

DISTINCTIVE FEATURES, CLASSIFICATION,

WITH

REMARKS UPON THE CLASSES.

Bird cover in front

AND A

SPECIAL TREATISE

UPON THE

NATURE AND TREATMENT OF THE WOUNDS RESULTING FROM
THE BITES OF VENOMOUS REPTILES.

EXPERIMENTS, &C.

BEING A REPORT OF A COMMITTEE TO THE

MEDICAL ASSOCIATION OF MISSOURI.

BY A. F. JETER, M. D.,

OF PALMYRA, MO., CH'N. COM.

LIBRARY
1845 D.C.
as directed D.C.

QUINCY:

PRINTED AT THE HERALD OFFICE, SOUTH WEST CORNER PUBLIC SQUARE.

1854.

WDC
M489p
1854

NATIONAL LIBRARY OF MEDICINE
BETHESDA 14, MD.

Film 8212 Item 5

POISONED WOUNDS.

The subject of envenomed wounds, when viewed *in extenso*, comprises a numerous and important variety of maladies, far too comprehensive, of course, to be repletely dwelt upon in an article limited in length, as this report must of necessity be. Poisoned wounds differ from other classes of wounds, *mainly*, in the fact, that the danger attendant upon their reception, is not measured so much by their location, depth of penetration, and the extent to which they engender solution of structural continuity, as by the *amount* and *virulence* of the virus with which they are inoculated, and the facility with which the virus is absorbed and conveyed to the nervous centres. The mere physical injury resulting from the fangs of the most deadly reptile, or the slight puncture or abrasion of surface from the poisoned arrow, unaccompanied by the poison, would often prove entirely unworthy of notice ; but when contaminated by their morbidic venom, they always superinduce symptoms of the gravest portent, and frequently, despite of all agencies to the contrary, overwhelm and suspend the powers of life, with almost the magical quickness of the lightning's flash.

Holding in view the source of their poisons, these wounds may, if not appropriately, at least conveniently, be divided into three general classes :

First. Those consequent upon the inception of morbid animal virus.

Second. Those arising from the absorption of the envenomed secretions of healthy animals.

Third. Those originating from the imbibition of vegetable poisons.

The first named class, to wit: "those consequent upon the inception of animal morbid virus," might very properly be sub-divided into two subordinate classes: first, those that proceed from the absorption of the poison of dead animal matter, generated by putrefaction, as in dissecting wounds, or where remnants of the secundines are retained in utero, putrefy and become absorbed; and secondly, those growing out of the absorption of the perverted secretions of diseased animals; as for example, Glanders or Farcy in the horse, inoculation of Small-pox, Rabies in the dog, Syphilis, Gonorrhœa, &c. &c., constituting an extended, highly important, and *specific* class of diseases.

There is also another distinguishing feature peculiar to this class of poisons, which is worthy of notice in passing. A certain period of time after their introduction into the system, seems essential to the development of the peculiar symptoms to which they severally give rise. This period is of uncertain duration, varying from several days to as many weeks, or even months, depending upon the kind of virus, and doubtless also in some measure, upon the constitutional susceptibilities of the party poisoned; owing to its analogy to fermentation, the process, to which poisons are thus subjected is called *zymosis*; and from this view of the subject, it would appear that in order to establish a disease of this class, it was necessary that the little leaven (poison) originally received into the system, should have time to leaven the whole lump of the animal economy; or in other words, that these poisons must pervade and pervert the blood, and, by some process not yet definable, increase their own quantity, and so augment their own influence, before they can produce their peculiar train of symptoms. Some of those poisons, as that of Syphilis, seem to possess a double zymotic influence; on being brought into contact with a part, an interval of incubation ensues, when a chancre results, here in turn venereal pus is produced, which is re-absorbed, and vitiates after a time the general system, bringing about the constitutional or secondary form of the disease.

The second general class, or "those wounds arising from the absorption of the envenomed secretions of healthy animals," are a species of injury inflicted by the stings and bites of a multitudinous host of insects and reptiles, having a range of variation in the degrees of their malignancy, from the sting of the most insignificant and trivial insect, to the bite of the most virulent and deadly serpent; supplying almost every link in the extended catination of gradations, from the *chigoe* and *seed tick* (*Acari Americanos*) of our own country, to the deadly asp of Egypt's spirited Queen; and though nothing perhaps would seem more incongruous to the casual observer, yet evidence is not lacking which tends to prove, that widely as these wounds appear to differ, their variation consists more in degree than in the essential nature of their poisons. Few persons, without mature reflection and observation, would be apt to conclude that the pungent burning of the bee sting was caused by a poison very similar if not identical in nature with that which renders the bite of the rattlesnake a terror to man and beast.

It is, however, a fact well known, that where a sufficient number of wasps, bees or hornets have united in stinging a person to overcome the vital energies, they produce symptoms both local and general, in all respects similar to those resulting from the bite of the poisonous snakes; and in aged subjects, or children of tender years, it requires but few of those creatures to produce those extreme symptoms. Several years ago, we saw an old negress who was stung by three hornets upon the neck, which had well nigh proved fatal. For a time she suffered intense pain in the injured part, followed in ten minutes by distressing nausea, great weakness, coldness of the surface, violent and irregular action of the heart, and in half an hour she became comatose, and utterly prostrated, from which she was only relieved by a quantity of stimulus, totally inadmissible under any other circumstances. Previous to the foregoing case, we had seen two boys, aged respectively five

and seven years, in a similar condition, caused by their overturning a bee hive, and a horde of these insects stinging them at once; and even since our attention has been directed particularly to this subject, an instance strikingly illustrative of this view has come directly under our charge. A vigorous and healthy child seven weeks old, was stung by a wasp, immediately over the longitudinal sinus in the anterior fontanelle; for a few minutes after the infliction of the sting its sufferings were great, attended with constant vomiting; in ten minutes it became comatose, and when we saw it at the expiration of a quarter of an hour, it had all the appearances of collapse. The integuments of the head were much distended with blood, apparently extravasated, the extremities were losing temperature, the pulse slow, feeble and irregular, as from an excessive opiate. It remained in this condition, notwithstanding a quantity of stimuli almost incredible, for eighteen hours, when reaction slowly ensued, followed by the usual low form of irritative fever, common as the sequel of poisoned wounds, from which it did not recover until after the expiration of ten days. These with innumerable instances of like character detailed in the books, go to exhibit, that where the poison of insects bears the same proportion to the powers of life, it exercises precisely the same sort of influence as that of the Viper or *Crotalus Horridus*. The converse of this fact is likewise entirely true, where the serpent is small, or partially venomous, or where circumstances prevent the injection of much poison into the wound; the consequences assimilate, in every particular, the stings of insects, even to the discoloring of the skin in the wounded locality, which in severe instances is generally of a greenish purple color, or sometimes tinged with yellow; and these shades of color, in proportion as the virus is less malignant or diminished in quantity, approach the florid hues of phlegmonous inflammation, insomuch that where the local precede some little time the general symptoms, we may frequently judge of the extent of the injury by the color of the part. In adducing

the preceding facts to establish the close analogy if not identity which exists in the nature of the poisons of insects and reptiles, we may be thought by some guilty of supererogation, since it has doubtless been observed and mentioned by preceding writers upon this subject; still, however, when we reflect that comparatively few of those who have seen poisoned wounds at all, have seen any but extreme or individual instances, we may well imagine that it might seem paradoxical to them, to suppose that there was no difference except in degree, between the poisoning from the sting of the wasp and the bite of the crotalus—the one a mere local wound, attended with comparatively little pain and swelling, the other always inducing the most frightful and formidable effects, and frequently progressing hastily and irresistibly to a fatal issue. In no department of natural science, however, would we be enabled to perceive the relationship of phenomena by an observance of extreme facts; it is only by tracing them through their various gradations, step by step, from one extreme to another, that even the mind of a Newton can discover their kindred character.

Before proceeding with this class of wounds, which is the special subject of our report, it would be proper to advert briefly to the third general class of poisoned wounds, or those consequent upon the imbibition of vegetable poisons. The woorari, and other poisons of savage warfare, have long been celebrated for the violence of the symptoms they produce when brought into contact with wounded surfaces, as if by direct sedation, almost instantly causing the nervous system to succumb, and if the quantity of poison received be sufficient to overcome the powers of life, death speedily supervenes, unless life is sustained by artificial respiration, constantly and vigorously maintained until reaction ensues. The chief difficulty in counteracting the effects of this poison, is the rapidity no less than the potency with which its influence is established. No stimulus that we possess, however potent

and diffusible, is sufficiently so to resist the depressing tendencies of this poison, when received in any considerable quantity. It would appear to operate by suspending the functions of innervation without destroying immediately the irritability of the heart. It is said by some, that if the blood be kept pure by artificial respiration, until the effects of the poison passes off, resuscitation may take place.

But by far the most common and troublesome, though not dangerous vegetable poison that we have to contend with, is that of the *Rhus Toxicodendron*, or poison oak. The poison of the green leaves or inside bark of this vine, is so penetrating, that if brought in contact with the callous surface of the palms of the hands, or the soles of the feet, it will induce inflammation; and where it is extensively applied, or where it touches an abraded surface, the inflammation is often severe, sometimes attended with considerable constitutional disturbance, such as high fever, nausea, &c. In an instance of a delicate female we saw *Angeiouleucitis* and *Phlebitis* result from the absorption of this virus. The inflammation arising from this source may generally be recognized by having somewhat the character of erysipelas, with a vesicular eruption superadded. Saline aperients and frequent ablutions of the part with Labarraque's solution of hyperehlorite of soda, have been sufficient in our practice to relieve in a few days all ordinary instances of poisoning by this vine.

Having glanced thus hastily at the more general aspect of envenomed wounds, we proceed to the consideration of the special subject of our report—"The bite of the Rattle Snake."

It must be regarded as a favorable circumstance, that very few comparatively of the myriads of serpents that inhabit the temperate and tropical regions, are to be dreaded for their venom. If the legions of these reptiles that infest the recently settled States of the west, were all as deadly as the *Cobra di Capello* of India, or the *Crotalus Horridus* of the western hemisphere, our hardy pioneers would find in them enemies

more formidable than the aboriginal savages who roam over those wild plains and valleys on our western border. In Missouri, snakes are in many of the rural districts very numerous; though so far as our observation extends, with the exception of the Rattle Snake (*Crotalus*) and several species of *Trigonocephalus*, with perhaps an occasional specimen of the genus *Naja*, they are all of the non-venomous class. The Rattle Snakes, of which there are several varieties, are all indigenous to the western hemisphere, and surely if their pre-eminence is to be judged of by their superior malignancy, they are entitled to be ranked as the monarchs of reptiles. They are at once distinguished from all other Ophidians, by the well known appendage to their tails, *the rattle*. With this instrument, when disturbed, they make a peculiar vibrating noise, which generally makes their locality a solitude; for with few exceptions, all animals are fain to scamper off upon hearing this unwelcome sound. There are several species of the *Crotalus*, and though they differ somewhat in size and color, they are alike venomous. They frequently attain the diameter of a man's arm, and four or five feet in length. "They are of an orange, tawney and blackish color upon their backs, and of an ash color upon their belly, inclining to lead. The male may be distinguished from the female by a black velvet spot upon the head, and by the head being longer and smaller." Rattle Snakes are found in many portions of the Southern States, and as far as forty five degrees north latitude. Stony, mountainous regions and dry, grassy plains, appear to be their favorite places of abode. Except for food, they rarely molest an animal; but they are prompt to resent an intrusion, and not always either, as some say, giving timely notice with their rattle of their design.

Although we do not conceive it our province to enter fully into the natural history of these reptiles, yet some description of their poisonous apparatus, and their method of inflicting bites, would probably not prove uninteresting or out of place just here.

The venomous glands, one of which is situated on either side of the head, have a duct for the elimination of the fluid they secrete near the gland; there is in this duct a ^{small} ~~specular~~ enlargement, capable of holding in some instances as much as ten drops of liquid. It is usually found distended with poison, and being so placed as to be compressed by the temporal muscle, when contracted, its contents are made to pass along the duct until it enters a canal or groove, as may be, at the base of the venomous fangs; which canal or groove is continuous with the duct, and perforates the longitudinal axis of the fangs, so as to convey the poison to the bottom of any puncture they may make.

The fangs are attached by a hinge-like articulation with the upper maxillary bone. Being moveable they are always found turned back beneath the surface of the upper jaw, and except the points, are concealed by a membranous duplication. The disposition of the fangs enables the snake to close its mouth, or to take food, and also by doubling the neck of the poison duct upon itself, prevents the incontinent flow of the poison. Though it would appear that these reptiles are provided with a special muscle for the purpose, yet we have often found them without the voluntary power to erect their fangs to a right angle with the jaw; and in such cases it is only by fixing the points in some soft structure, and then forcibly recoiling from it, that they can make their fangs penetrate, or elevate them sufficiently to admit of the escape of the poison. Hence a serpent placed in a glass jar, or anywhere where it cannot hang the points of its fangs, though it may make vigorous efforts to bite, it is often entirely unable to eject its poison; it may freely put forth its saliva, which has doubtless been mistaken for the poison, but on examination of the duct, its poison will still be found there. If, however, it strikes a soft tissue, or any object the diameter of which it can grasp in its mouth, after about the fourth effort its stock of poison is exhausted, and it is rendered comparatively harmless for several days. Serpents are usually found in coil, and their strike or spring

upon an enemy is accomplished by suddenly and forcibly straightening out their body. In this movement the head is elevated, and the mouth widely distended, so that the upper jaw, when it comes in contact with whatever they desire to bite, is usually passing downward and forward; and when its progress is arrested by the doomed part, the snake immediately recoils with a jerk so forcible as to leave its fangs, sometimes, in the flesh of its victim.

The consequences flowing from the introduction of the snake's virus into the human system, as remarked in the outset, depend in a great degree upon the quantity and rapidity of its absorption. When the fangs of the serpent penetrate a venous trunk or its immediate vicinity, the constitutional always precede and overshadow the local symptoms; neither the pain nor the swelling is usually very great in the wounded locality in such cases, but extreme lassitude and weakness are soon manifest. Intense nausea and vomiting in a few seconds, become a distressing and prominent symptom.* The eyes for a time have an unnatural glare, as if from slight intoxication. This, however, soon gives place to a vacant stare of dullness, and an overwhelming sense of prostration. The pulse, at first slow and full, soon becomes feeble and irregular, followed by a painful sense of oppression in the cardiac region. The breathing is laborious and interrupted, the surface loses its temperature, and is usually bathed in perspiration, the vital powers gently subside, and the victim sinks from existence in a placid swoon.

On the other hand, when the poison is not so hastily taken into the circulation, which is far more frequently the case, the local symptoms take precedence. Instantly, upon receiving the bite, pain of intense severity is experienced in the part. An intelligent gentleman who was bitten by a copper-head, compared his sensations to those which we might imagine

*At the time of writing the above, we were of the opinion that this symptom had been previously overlooked; but since then we find it noticed in a late work upon poisons, by Alfred S. Taylor, F. R. S.

would result from thrusting a red hot iron into the flesh, and from which constant electrical shocks were passing to contiguous parts. In severe instances swelling immediately sets in, and frequently proceeds so rapidly as to be perceptible to observers several paces off. This swelling is not the result of inflammation, in the sense in which Miller uses that term, nor indeed does it in severe cases attain that grade of vascular incitement known as active congestion; but it is simply a passive engorgement, a static condition of the blood, consequent upon the paralysis of the vessels of the part, and a continued action of the vascular trunks beyond the more deadly influence of the poison. The sub-cutaneous veins are all distended with blood, apparently coagulated. Indeed, the entire swelling, if one were to judge from its color, depends upon an accumulation of venous blood, which is sometimes tinged with green or yellow by the serpent's virus. The pain, which is at first almost insufferable, soon leaves the part in which it was originally felt, and travels in a cardiac direction, just in advance of the swelling; so that if the swelling ascends from the foot to the groin, pain is usually felt in the internal iliac region. If their vitality is not too much lowered by the poison, the veins and lymphatics of the injured member always inflame, constitutional symptoms soon follow, beginning with nausea, and vomiting, enervation and sinking, which augment if the quantity of the poison be great enough, until a collapse is attained, or even to death if life is not upheld. When the venom has become diffused through the circulation, it often induces raving delirium; and at other times causes the most torturing agonies throughout the body. Well might the victim of this untoward accident exclaim in the language of Scotia's bard:—

My curse upon thy venom'd stang
That shoots my tortured veins along;
And thro' my heart gies mony a twang,
Wi' gnawing vengeance:
Tearing my nerves wi' bitter pang,
Like racking engines!

In a majority of cases, when the nervous system is prostrated by the venom, the patient remains in a condition very

analogous to a congestive chill, for a period varying from a half hour to two days or more, when reaction ensues, which is followed by a low typhoid species of fever that is frequently of protracted duration, and often fatal, unless some efficient means be adopted to sustain the patient, and eliminate the the poison from the system.

Of the *modus operandi* of the envenomed secretions of healthy animals, it becomes a matter of exceeding interest to inquire; in doing which we are not unapprised of the fact that we must invade the territory in dispute, between the humor-alists upon one side and the solidists upon the other. Without, however, desiring to be enrolled with either sect, we proceed briefly to consider the subject in connection with a few facts, some of which have transpired under our own observation.

An extensive series of experiments upon animals, performed by J. Blake, M. B. F. R. C. S., and recently professor of anatomy in the Medical Department of St. Louis University, resulted in his entire conviction that absorption and dissemination of all poisons through at least one side of the circulation, was an indispensable pre-requisite to their influence upon the general system, and that in consequence an interval of not less than "*nine seconds*" was essential in all instances to their manifestations upon the nervous centres. These views, we may further remark, are either acquiesced in or stoutly maintained by a great portion of the medical world. That all poisons do act mainly by being absorbed into and diffused by means of the blood, is obviously true; and that many poisons, more especially those of the *specific* class, act wholly in this way, is likewise true; but that some of the more virulent poisons, including that of the most deadly reptiles, do sometimes act by direct nervous implication, or at all events in less time than "*nine seconds*," we are well assured, and in substantiation of which we can adduce any reasonable amount of proof. That the sensoria can be impressed through their nervous

connection with remote organs, must be apparent to all, when we reflect that a blow or a pistol shot in the epigastrium will frequently cause an instant suspension of animation, without doing violence to any vital organ, or that the lancing of an abscess even in the sole of the foot, will sometimes cause fainting; and also that we constantly witness analogous impressions in the shocks resulting from gun shot wounds, or extensive superficial burns, and indeed under many other circumstances where nervous communication alone can account for the disturbance of the sensorial functions. The virus of serpents, where it is applied to nervous matter, operates locally in a two-fold character; when concentrated, or in sufficient quantity, it causes paralysis at once; but when the quantity is sufficient to paralyse without corroding, it becomes one of the most violent irritants of which we have any knowledge. Inasmuch, therefore, as other offending agents do instantly and even fatally impress the nervous centres by acting upon the sentient extremities of the nerves, is it to be wondered at that this most violent of all irritants, though acting differently, should through the same medium effect similar results? It will be said, and with considerable show of reason too, that this species of influence when exerted by poison is incidental, and differing no way from the shock ordinarily attendant upon injury however caused, and therefore it is not the effect of the poison, strictly and properly speaking; but when we consider, that no other class of passive or chemical agents, accompanied by so small an amount of mechanical injury, cause anything like analogous consequences, and that this effect is almost uniformly present in such cases in a greater or less degree, we may well mark it as one of the peculiar phenomena of the poison. We admit that in many instances absorption and diffusion, to a limited extent, must take place before enough of nervous tissue becomes implicated to excite a degree of sympathy necessary to overcome innervation, still its influence is nevertheless established before the poison in

substance can possibly reach the brain through the blood, granting even that it could do so in "*nine seconds*."

Without prolonging our remarks upon this point, we will offer testimony in behalf of what we have already set forth:

The author of this essay, in the summer of 1848, was in a harvest field where a negro man was bitten upon the back of the hand by a large copper head, and so quickly was he affected by the poison, that he sickened and ejected the contents of his stomach before he could relate to the by-standers what had befallen him. Had this negro fainted or become insensible, it might have been attributed to fright; but as vomiting is usually an accompanying symptom of this accident, without to our knowledge being regarded as an indication of fear, it is fair to presume it proceeded from the poison. It was in view of the almost instantaneous supervention of the foregoing symptom, upon the bite of the rattle snake, that Dr. Barton of our own country, in his writings, asks the question, "if it is not probable that the venom of reptiles has a primary influence upon the nervous matter of animals?" Which question J. F. South, in his notes to *Chelius' Surgery*, (vol. 1 p. 391) answers affirmatively, and says furthermore that Russell of India mentions several instances where death followed the bite of the Cobra di Capello in a time too brief to admit of the diffusion of the poison by absorption. Four well authenticated instances have come to our knowledge, where persons have been felled to the ground by the bite of the *Crotalus*, as if from a blow upon the head. Two of these cases died in a few minutes, without being able to rise up after being bitten; another of them, a lady with whom we are well acquainted, and who remained insensible for eight hours or more, has often assured us that she was not apprised of the nature of her injury until she regained consciousness, and was informed by those who witnessed its occurrence. She recollects, whilst feeling in some vines for melons, to have felt very suddenly a severe pain beginning in the hand, but which to use her own language

“darted in hot flashes all over the body, thrilling to the end of every nerve, followed instantly by such a giddiness as to cause her to fall insensible to the ground.”

The well known instance of a German lady occurred in this county last summer: this lady, remarkable for her vigorous and robust health, was stung by a wasp upon the front part of the wrist, just back of the anterior annular ligament. Immediately sickening, she called for water, but before it could be handed to her she fell upon the floor and expired in a few seconds. Now, to ascribe the fatal issue of this case to the physical hurt of the insect's sting, would be the climax of absurdity; and to suppose that so small an amount of poison could be distributed in so short a time through the circulation, would in our opinion be equally preposterous.

Cases of similar import we might add to the above, if space allowed, or if we deemed it necessary. A series of experiments performed by ourselves, some time since, might shed some light upon this subject: Taking several geese, we by means of a sharp instrument removed, without apparent injury to the fowls, a section of the parietal bone, so as to expose the membranous covering of the greater lobes of the brain. Then severing the head from a crotalus of about medium size, we dissected out the poison apparatus, and raising it in a pair of dressing forceps just over the fowl's cranium, we clipped the neck of the duct, letting fall two drops of its contents immediately upon the brain. This experiment was repeated eleven times, and in two instances the fowls died instanter. Others would make a violent start at the moment of the poison's contact, but would quickly exhibit signs of torpidity. Their eyes would close, their wings relax, heads droop, their breathing become feeble and interrupted, and dissolution follow generally in less than half a minute, though in several instances not until a minute and a half had elapsed. The poison here being applied directly to the nervous centre, its action in destroying life, after all, had only to be local. Wishing, however, to test

this matter somewhat farther, we resorted to other means of determining its mode of operation. Taking two dogs, pups of the same litter and nearly of a size, we exposed in one of them the femoral vein, and getting a gland from a rattle snake that was above medium size, we endeavored by opening the vein, to introduce the whole contents of the sac into the circulation. The animal seemed to experience no additional pain from the poison, for about half a minute, when the eyes acquired a preternatural brightness, followed in about a minute with vomiting and great loss of strength, with violent horripilations. These symptoms lasted nearly eight minutes, when the animal expired.

In the second one of the dogs, we carefully exposed a large nerve accompanying the large vessels upon the interior of the hind leg, and in order to have all vascular connection removed, we ligated and removed segments of both vein and artery, and gently elevating the nerve, isolated it from surrounding tissues by placing it upon the polished surface of an ivory plate. Taking the gland from the opposite side of the same serpent, we poured its contents upon the isolated portion of the nerve. Barely had the poison touched it, before the animal gave vent to a loud yell of anguish, and springing away from those who held it, attempted to run, but could not proceed, its hind extremities being obviously paralysed. The impression upon the nerve to which it was applied must of course have been made before the dog broke away from those who held it; but in its movements some of the virus may have reached other tissues. At all events, the animal sank down, and died in a little over three minutes, with the usual signs of the poison. These cases alone prove nothing, and are only mentioned here to show our method of procedure. After more than fifty experiments upon dogs, cats and hares, conducted on this plan, we arrive at the following conclusions:

1st. That in by far the greater number of instances the envenomed secretions of healthy animals act mainly upon remote

organs, by being diffused through the blood and disturbing the functions of innervation.

2nd. That in all instances where serpent's virus is applied directly to a nervous branch, if it be sufficiently concentrated or in sufficient quantity, paralysis of the nerve ensues, not confining itself to that portion of the nerve merely which the poison is made to touch, as do morphine and other narcotics, but always extending more or less towards the source of the nerve.

3rd. Where the poison is insufficient in strength or quantity to paralyse the nerve to which it may be applied, it irritates, causing much suffering to the animal, and inducing sooner or later general symptoms, such as nausea, extreme debility, giddiness, and sometimes convulsions.

4th. That in occasional instances, constituting a rare exception rather than the rule, snakes' virus acting upon nervous matter, will suspend innervation in a manner very similar to an electrical shock.

5th. That what is termed a nervous shock is not necessarily, as some suppose, the result of a single and violent impression, which at one impulse arrests the functions of the nervous system, but that continued irritation of intense violence, although it may not arrest innervation at the outset, will nevertheless do so, after an appreciable interval, as it were, by an accumulation of its influence.

Guided almost entirely by our own observations, we had several years since adopted and written out the foregoing conclusions, without being very intimately acquainted with the views of the profession in general upon this subject. We were therefore much gratified in reading a very recent and reliable work upon poisons, written by Alfred S. Taylor, F. R. S., and having special reference to medico-legal facts, to find precisely the conclusions entertained by him, that our own investigations had long since led us to regard as true.

Upon page 33 and 34, of the work referred to, the author

repeatedly states, that many of the poisons act too speedily to admit of explanation upon Mr. Blake's hypothesis, and cites numerous cases from such men as Christison, Sir B. Brodie, Addison, and Morgan, to prove the truth of his views. For example, he says in speaking of sympathy: "This view of the action of poison is founded on the fact that some of these agents produce their effects with too great rapidity, to allow the supposition of absorption being necessary. Thus, concentrated hydrocyanic acid in large doses, strychnia, and other alkaloidal poisons, will affect an animal in a few seconds. In administering hydrocyanic acid to three young cats, the symptoms of poisoning came on immediately, and death took place, as nearly as could be ascertained, in from five to ten seconds. Sir B. Brodie and Dr. Christison have also observed this instantaneous action on animals in employing alcohol and muriate of conia. There was no perceptible interval between the contact of the poison and the production of its effects. In some instances, the effect of these powerful agents on the nerves has been actually visible; as in the instance already cited, of the immediate arrest of the peristaltic motion of the intestines by the contact of ticunas." There is a marked discrepancy in the opinions of Mr. Blake and Dr. Christison, touching the length of time necessary for a poison's action. The latter, in his work on poisons, page 16, mentions an instance where a dog died from an injection of muriate of conia into the femoral vein in *three*, or at most, *four seconds*; whilst Mr. Blake, in using the same poison in a similar manner, found the effects not coming on until fifteen seconds, and that the animal survived double that length of time. From what we have ourselves seen of the variation and irregularity of the action of poisons, we can easily believe that both these gentlemen are correct in their noting of the effects of the poison, in their respective cases. The great, and perhaps only objection in our opinion, to Mr. Blake's theory, being that it is too absolute and exclusive.

Mr. Taylor includes, and very properly we think, the virus of the rattle snake among those agents which sometimes act instantaneously. In taking leave of this part of our subject, we would recommend to those interested in this important branch of science, the excellent work of this author upon toxicology; and we do so both from his known ability as a writer upon medical jurisprudence, and also from his statements of facts corresponding in a higher degree with what we have actually seen, than those of any other author to whom we have had access.

Of the essential nature of serpents' virus, but little is known, although much has been said. The quantity usually obtained being too small to admit of anything like trust-worthy chemical analysis, of course, therefore, not much is known of its elementary nature. Its color is more frequently of a greenish tint, though sometimes yellowish; its consistence being about that of saliva, and though tasteless, it is not, as many suppose, harmless when taken into the mouth or stomach. Administered to cats or dogs upon empty stomachs, it soon causes sickness, and is followed by the usual consequences of the snake's bite, though perhaps not in so severe a form. Placing a drop of it upon the tongue, in a short time we experienced a decided sense of numbness about the tongue and lips, which lasted half a day.

Although we have made no strenuous efforts to do so, yet by shielding the virus of serpents from air, as is usually done with vaccine virus, we have been unable to preserve its malignancy for any considerable period of time. Dr. Christison, however, mentions seeing the virus of the Cobra di Capello retain its virulence at the end of fifteen years. Various menstrua have been named as preserving it in purity, and strange enough, some have recommended for this purpose, nitric and sulphuric acids! poisons not less malignant than the virus itself, and known to destroy all forms of animal matter with which they come in contact.

From our observance, we are led to believe that the poison of serpents varies so much as to render its effects to a considerable extent uncertain. A serpent will sometimes bite a dog, inflicting comparatively little injury, and perhaps at the expiration of a fortnight it may bite another of equal size, in the same part of the body, and death is the immediate consequence. The like variations we have also witnessed in killing different serpents, and applying their venom directly to living animal tissues. What this difference depends upon, we are unable to say; but one thing may be set down as true, that the virus of a serpent is directly proportioned, both in quantity and malignancy, to its age and size: the older and larger ones always exceeding in this respect. Nor are we inclined to believe that climate controls their virulence, except so far as it retards or promotes their growth; and this view we base upon the fact that a serpent revived by artificial heat in mid-winter, is, so far as we can judge, as venomous as at any other season of the year.



TREATMENT.

—:—0:—

The dire necessity that always does, or is supposed to exist for doing something when these accidents occur, combined with the uncertainty of all remedies proposed for their relief, and the absence of anything like a reliable system of treatment, has caused an infinite number of agents to be resorted to in such cases; remedies, many of them at least, but little less pernicious to the vital economy than the poison for the relief from which they were given. Not a few of those remedies have acquired a high reputation as specifics for this poison, but which, however, have not withstood the test of experience. Arsenic in large doses, as combined in the celebrated Tanjon pills, has enjoyed a high degree of favor, and still does with some, as a specific for these wounds. Our experience with arsenic, extending to four or five cases in persons and a much greater number in dogs, is very adverse to its favor; having never seen any good, but some evil effects result from its use. It is true, in common with every other irritant, it will be tolerated by the system when depressed with this poison; but if the vital powers react before the expulsion of the arsenic from the stomach and bowels, we have occasion to know that it will give origin to all the evil consequences that usually follow its too free administration in health.

The plan of treatment which we consider most proper to be pursued immediately upon the reception of the wound, is that long recommended, and which has for its object the prevention of the diffusion of the poison through the system by absorption. Various expedients are had recourse to for this purpose. Excision of the part, its destruction by caustic, actual or po-

tential, may all be very efficient measures of relief in such cases, if resorted to in time. Suction with the mouth or with cupping glasses, after free scarification, are also useful means of averting the evils of this poison when timously used. Ligation of the member on the cardiac side of the wound will at least prevent such rapid introduction of the poison into the circulation as would be likely to prostrate the nervous system, or at all events, suffice until some remedy for sustaining the vital powers can be obtained. These appliances, however, are only available for a few minutes after the bite, and unfortunately are rarely brought into use, in consequence of the absence of both physician and materials from the scene of accident. The medical man, therefore, rarely sees such cases until the general symptoms claim his attention; and here the indications are so obvious that we are at a loss to conceive how any one versed in the nature of disease can hesitate for a moment what class of remedies are adapted to the case. When constitutional effects are manifest in any degree, their manifestation is characterised by a sinking of the vital powers, the nausea and vomiting almost invariably attendant upon such instances, being the result of relaxation consequent upon enervation, as after tapping for ascites, where a stimulus is removed by abstracting a large quantity of water. Potent and diffusible stimuli of course are strongly indicated as fulfilling for a time the requirements of such cases; hence the practical good sense of our western people, among whom these wounds are common, has long since pointed to alcoholic stimulants as affording the surest relief of all remedies from serpent bites. It is not probable that alcohol exercises any specific antidotal virtues in such cases, but counteracts the poison simply by stimulating and upholding the vital powers. The poison tends to the utter prostration of innervation, whilst the remedy judiciously given, tends to maintain and exalt that function. It is not, therefore, so surprising after all, that patients when severely poisoned, should always be so difficult to impress with

stimulants. The author has administered to a girl between three and four years of age, in the space of five hours, three half pints of fourth proof brandy, without any signs of intoxication ensuing. In administering alcohol, therefore, as a remedy for the bites of serpents, we must, as in giving opium for cholic, be governed by the consequences and not the quantity; so long as the patient continues to sink, we should continue unsparing in the use of the remedy; taking care, however, when its stimulating effect begins to be felt, not to carry it to that height that would change the character of its action, and convert the stimulant into a sedative, and likewise, also, guarding well that we do not let the stimulus subside, and the poison again obtain the ascendancy. The form of alcohol that we regard as most applicable for such purposes, is the simple spirit of wine itself, as found in commerce. This sufficiently diluted and sweetened just enough to destroy its pungency, so as to admit of its being swallowed, is probably the most energetic and prompt form in which alcoholic stimulants can be given; unfortunately, however, for the utility of this remedy, and all other remedies that have to be taken by the mouth, in many cases, and those too of the severest grade, the vomiting is so constant and excessive that nothing can be retained for a moment upon the stomach; and as only a large quantity of any stimulus will suffice, as a matter of consequence they are often rendered of little avail. When such condition arises, sinapisms over the whole body are perhaps the next most reliable means of averting collapse. Dashes of cold water along the region of the spine may also be useful, and even flagellation, or any other method of keeping the function of innervation in a state of activity until the force of the virus is in some measure expended.

The treatment hitherto mentioned is such as we deem applicable to the early stages of the malady, and calculated merely to avert the extreme consequences of the poison that immediately follow its being taken up into the circulation,

rather than relieve from any evil already done, or that which must inevitably ensue. After a time of greater or less length, reaction from the depressing effects of the virus takes place, and though vital action may continue at a low ebb, still, the general aspect of the case is greatly changed: the nervous system from a state of torpor, becomes irritable and sensitive; violent pain is felt in the loins and joints; there is also frequently severe nervous headache; the circulation, though still feeble, is hurried and excited; the skin is dry and hot; the tongue is thickly coated, and of a dark brown color; considerable thirst, but no appetite for food; all the secretions are much perverted or wholly arrested, and in severe cases the patient's tendency is still downward. Other indications here present themselves to our notice, and when we consider that all this derangement of the economy is caused by the presence of a deleterious agent which is still extant in the circulation, we may well conclude that its elimination is an object of the first importance as a means of cure. Several years ago we arrived at the same conclusion from observation, that Orfila has since demonstrated by experiment: that all poisons are drained off from the system mainly by the kidneys. All instances of favorable recovery from poisoned diseases, that we have witnessed, have been preceded or accompanied by profuse diuresis; and this has been the rule, whether the diuresis occurred spontaneously, or as the result of medicine. The bowels being generally inactive, as a preparatory step, an aperient may usually be premised. It is not however so easily determined what particular diuretic is best adapted to the end in view; but we feel strongly inclined to give preference to Labarraque's solution of the hyperchlorite of soda, given in teaspoonful doses to adults, combined with a stimulant if one is still necessary; diluted whisky or wine being the most proper stimulus for this purpose. It may be repeated every hour and a half or oftener, until diuresis and diaphoresis are established. Or we may use buchu, or uva-ursi, or cream of tartar, or any

of the class of remedies that induce serous secretions. Where the necessity for stimulants is not urgent, carb. amm. and camphor may be substituted for the more diffusible stimuli. Quinine and other tonics often subserve useful purposes in those attacks, but opiates, in our experience, have been uniformly hurtful.

Meanwhile, the local symptoms will be claiming our attention; for in many cases they assume a most formidable aspect, and are not unfrequently the cause of death. As before remarked, the grade of inflammation in the wounded part depends upon the extent of the poisoning; where that is not great the inflammatory excitement is often high, presenting much the appearance of phlegmonous erysipelas. Here the constitutional symptoms are not usually severe. Free inunction with olive oil, repeated several times a day, and the wounded part enveloped in flannels saturated with the oil, generally afford relief. Or constant bathing of the inflamed part with the spirit or aqua amm. or Labarraque's solution, will also, especially when aided in their effects by saline aperients, generally be productive of relief in those milder cases. But we frequently meet with cases where this plan of treatment will not suffice.

We are called, for example, to visit a patient twelve or twenty-four hours after the bite, and find him in a state of utter prostration; his circulation feverish and irritable, temperature elevated or lowered according to the extent to which vitality is affected, secretions both deranged and diminished in quantity, and the patient lies torpid in a low muttering state of delirium, occasionally, perhaps, aroused by a severe pain darting through the wounded member, which we will discover to be distended to its utmost limit of forbearance by an accumulation of blood. Though this swelling is so great as to render the skin covering it painfully tense, still it is very incompressible and easy to pit. The quantity of blood really flowing through the part thus afflicted is often very small, and barely sufficient to sustain the vital spark. Relief then must speedily

come, or gangrene and sphacelation will inevitably come on with their long train of evil consequences. It now becomes a matter of prime importance to determine what are the best means of relief. If we bandage the part, as in simple anasarca, and force this deteriorated blood into the general circulation again, charged as it is with poison, the patient will certainly be overcome, as we have actually witnessed. Or if we attempt by means of incision to let off the accumulated blood resting here, we only remove that small portion which still circulates and keeps the part alive, and in addition, the wound thus made will not heal, but end most likely in mortification. So that we repeat, it becomes a matter of the gravest consequence to decide how we can (to use the common similitude) miss the rocks of Scylla upon one hand, and avoid stranding upon Charybdis upon the other. In this instance, as in most others, the truth will be found midway extremes. We should begin by giving the patient a stimulus of wine or brandy, proportioning its quantity by the requirements of the case, and conjoining with it as a diuretic the solution of the hyperchlorite or the sweet spirit of nitre, in combination with a few drops of turpentine, or any medicine tending to promote a flow from the urinary organs and skin, as such a decoction of the *Serpentaria Virginiana* often subserves a useful purpose. Having established the influence of these remedies, it is proper next to gently bandage the swollen member, so as to compress gradually the blood gathered in its vessels back again into the general circulation, bearing in mind to slacken the bandage and augment the stimulus, if the patient begins to sink. If, however, mortification has actually commenced, or we fear it will immediately set in, it would be proper at the same time to dress the injured part with Labarraque's disinfecting solution, with from four to ten drops of creosote added to the ounce, or the solution may be combined with an equal portion of the oil of turpentine, and the part kept constantly swathed in cloths saturated with the mixture. Throughout the disease

the patient should not only be allowed, but from time to time urged to take a moderate quantity of wholesome food.

Having now touched upon the more prominent features which those wounds present for practical consideration, we will hastily recapitulate what we have passed over. First of all, then, after a person is bitten, prevent, if possible, the spread of the virus through the system, by the well known means already enumerated for that purpose, and which the good sense of every practitioner would at once suggest. Upon failure, however, to prevent the poison's entrance into the blood, the next object is to prevent its overpowering the nervous system. This we do by means of stimuli, alcoholic, when it can be retained upon the stomach, being the most reliable for this purpose. Though mustard plasters extensively applied, or flannels wrung out of hot turpentine, may be rendered very serviceable in averting collapse. When, however, reaction from the early depression of the poison takes place, stimuli are either combined with, or wholly abandoned for diuretics, diaphoretics, tonics, &c. The great objects of constitutional treatment being to sustain the patient and depurate the blood, whilst locally we aim to reduce the swelling, restore integrity to the circulation, and avert the liability to gangrene. This we fulfill by soothing and mollifying where the inflammation is high, or by using gentle stimulants and antiseptics, w Where the vitality is low, and the consequent tendency to gangrene great, the swelling can be reduced, and the circulation restored, by the gentle pressure of a bandage.

Assisted in some of them by Dr. G. W. Taylor, of Marion, we have performed numerous experiments in the treatment of serpents' bites upon animals; though the great length to which this report has already extended, will not admit of our giving them here in detail. With a view to the local neutralization of the poison, we have infiltrated the areolar tissue of the wounded vicinity, with various solutions, as the iodide of potassium, diluted muriated tincture of iron, Lugol's solution,

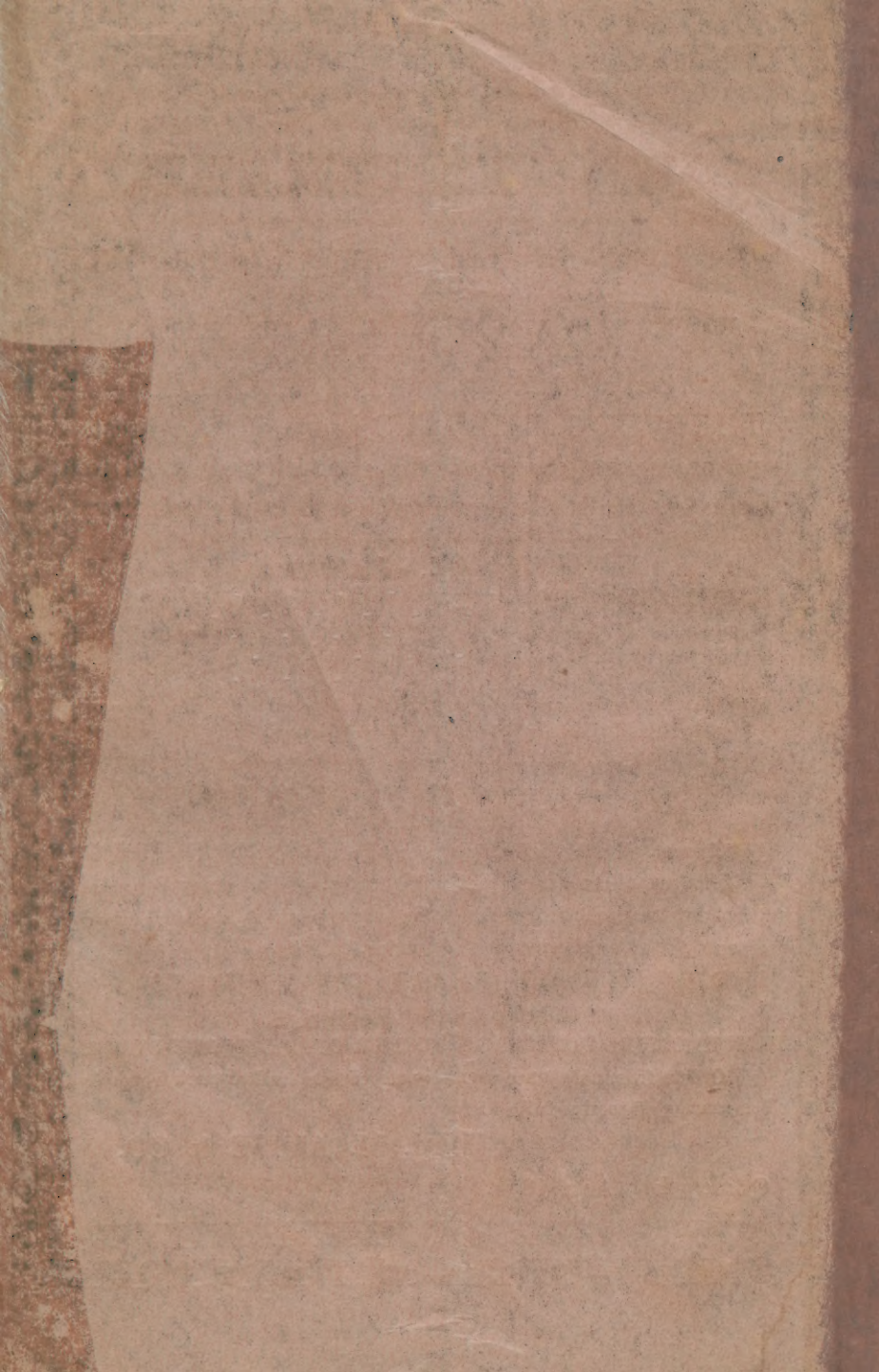
liquor, Labarraque, alcohol, spirit of turpentine, spirit of ammonia, &c. In no instance can we say that we have witnessed benefit flowing from using those remedies in this manner. Their only apparent effect in our hands has been to excite and increase the inflammation in the part in which they are thus used, or if not stimulating at all, as for example the solution of the iodide of potassium, they frequently, after being injected into the subcutaneous cellular tissue, remain there without, to all appearance, being in the least absorbed; imparting an oedematous condition to the locality. Although we have often injected alcohol and ammonia in considerable quantities into the living tissues of animals, yet we have never, when the animal was under the influence of poison, perceived that it stimulated in any degree. Our experience leads us to believe that any treatment for serpent bites that requires mechanical injury by incision or otherwise to be done to the wounded part, is attended with danger of mortification and sloughing. In over twenty-five cases where we have witnessed this method of treatment, we have at least seen no good derived from its use, and have never seen a wound made under such circumstances heal kindly. A young and vigorous horse having been bitten upon the nozzle by a crotalus, we within six hours from the infliction of the bite, injected with a sharp pointed glass syringe, half an ounce liquor Labarraque, diluted one half with water, into the contiguous and somewhat swollen cellular tissue. In about an hour inflammation came on afresh, and continued to increase until all the soft parts upon the front of the animal's head, up to the eyes, sloughed away, and it died on the third day following. In another case, where from two to four drachms of muriated tincture of iron, diluted two thirds with water, was injected into the areolar tissue in the groin of a dog, sloughing came on three days after, and in one night's time exposed the bones of the leg. The sufferings of the animal was subsequently terminated by a solution of strychnia, applied to the wound. Experiments upon this plan are inter-

esting and in some respects instructive; but we are inclined not to regard them as promising much of practical good, since if we even had an antidote that would neutralise the poison, the circumstances under which these wounds are generally received, are such as so render it almost impossible that the remedy could be used until the poison has done its worst. There are few things in practical medicine, however, more satisfactory than the manifest benefit in poisoned wounds which results from the judicious use of such remedies as have been named, when addressed to the general system. Active stimulants properly given will often prevent the patient's succumbing to the poison at once; whilst milder stimuli, diuretics, diaphoretics, tonics, &c., will often preserve the patient's life from the fever that follows on.

In five dogs severely poisoned by inoculation with the virus from the *crotalus*, all recovered under treatment; whilst of three similarly inoculated that were not treated at all, two died. Within the last twelve years, seventeen cases of snake bites have come under our observation, though only eleven of that number since we entered upon the practice. Of the whole number of these cases, two died in less than fifteen minutes after receiving the wound; five others, though suffering severe pain, were so inconsiderably affected as not to confine them to bed; the remaining ten were all severely poisoned, three of them so much so as to threaten for some time the worst results, though all of them recovered under treatment. Where vomiting does not interfere, and the patient can be brought under the effects of alcohol before prostration ensues, the subsequent fever is thereby greatly mitigated, and if the urinary organs are prompted to act freely in conjunction with the stimulus, severe cases are often relieved in a few days. When, however, collapse is suffered to come on, recovery, if at all, is likely to be much delayed.

From what we have ourselves witnessed of these wounds, in the human subject, and in a large number of cases detailed

to us by other physicians, amounting in the aggregate to about sixty well authenticated cases, as well also, as what we have witnessed of the effect of this poison upon a large number of animals, we feel inclined to believe, that at least two fifths of the snake bites that occur would recover without treatment; one half of the remaining three fifths will recover promptly with proper treatment, and possibly without any, whilst none of the remainder would survive without treatment, and half of them probably die in despite of it. Of the above sixty cases, thirteen died, above half of them were reported very severe, threatening loss of life, and the remnant, many of them at least, not at all serious, though inflicted by the crotalus. The clothing of the person, and other circumstances that put the serpent biting at a disadvantage, contribute to diminish the mortality of their bites. Horses having a tender skin, but thinly protected by hair, are quite as often killed by the crotalus as people.



TWENTY FIRST YEAR
OF THE

QUINCY HERALD.

Published Daily, Tri-Weekly, and Weekly, at Quincy, Ill.

WM. M. AVISE, R. H. MITCHELL, and AUS. BROOKS,
PROPRIETORS AND PUBLISHERS.

THE WEEKLY HERALD is one of the largest, handsomest and cheapest, and generally admitted to be one of the best papers published in the country.

TERMS.

One Copy One Year	\$1-50
Five Copies One Year	7-00
Ten Copies One Year	12-50
Fifteen Copies One Year	17-00
Twenty Copies One Year	20-00

To any one procuring a club of ten or more subscribers, a copy of the Weekly Herald will be sent one year free of charge.

HERALD JOB OFFICE.

Connected with the Herald, is one of the BEST BOOK AND JOB PRINTING establishments in the United States; and as we employ none but the very best practical workmen the country affords, we are always prepared at the shortest possible notice, to execute

JOB PRINTING IN ALL ITS VARIETIES,

Cheaper and Better

THAN IT CAN BE DONE AT ANY OTHER OFFICE IN THE STATE.

Orders from a distance promptly attended to, and all work from this office guarantied to give full satisfaction.

WM. M. AVISE & CO.

Quincy, Ill., Aug. 1854.